DOCUMENT RESUME

ED 470 155 IR 021 595

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TITLE	Integrating Internet-Based Learning in an Educational System: A Systemic Approach.
PUB DATE	2001-11-00
NOTE	12p.; In: Annual Proceedings of Selected Research and Development [and] Practice Papers Presented at the National Convention of the Association for Educational Communications and Technology (24th, Atlanta, GA, November 8-12, 2001). Volumes 1-2; see IR 021 504.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Educational Development; Educational Objectives; Educational Practices; Educational Principles; Higher Education; Internet; Systems Approach; *Technology Integration; *World Wide Web

ABSTRACT

The purpose of this paper is to identify the various components of the educational system in higher education, to illustrate how and where they interact, overlap, and come together so that it may be better understood how Web-based instruction (WBI) may impact higher education. A definition of an educational system is given, and three principles that should be considered when implementing WBI are discussed: (1) A system is a set of organized components working toward a common goal; (2) A change to one component of a system may cause a change in every other component of that system; and (3) Every educational system is different. A model of four essential primary components is presented, three of which are based on the common faculty perspective of the mission of the institution (teaching, research, and service), supplemented by the fourth factor, management. Five levels of Web use in education are then identified: informational, supplemental, essential, communal, and immersive. Focus then moves to use of this model to address higher education system components as they relate to WBI, and each of the four primary components is discussed in terms of how it relates to each of the five levels of WBI. (Contains 17 references.) (AEF)

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ED 470 155

Integrating Internet-based Learning In An Educational System: A Systemic Approach

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The first time we taught an online class, we didn't tell anybody that was what we were going to do. In 1996 when we first conceived of teaching a class on internet-based learning using the medium of internet-based learning, we weren't entirely sure how we would go about it. And given the myriad of rules and regulations associated with public higher education such as contact hours, new course approvals, and teaching evaluations as they relate to tenure and promotion, we thought it best that we keep things quiet less they go very, very wrong. Whether or not our first class went very, very wrong is open to debate, but our online course is no longer a secret (Harmon & Jones, in press; Harmon & Jones, 1999; Jones, Harmon, & Lowther, 2002; Jones & Harmon, In Press). Online courses are being taught at established universities and newly founded virtual universities. Department chairs, Deans, and Presidents are all anxious to put classes online. Position announcements specifically request people with online teaching experience, and course loads are defined by online courses. For better or worse, online courses are here, apparently to stay, and university teaching may be fundamentally changed as a result.

But teaching is only one part of higher education. For those of us working in the academy, we recognize immediately that what we teach and how we teach impacts our time and resources. And time and resources impact everything else we are asked and required to do. Consequently a fundamental change in teaching will also change how we do other things in higher education, such as research and service.

While we have defined varying levels of Web-based instruction (WBI) (Harmon & Jones, 1999), here we would like to take a broader look at WBI as it applies to higher education. Specifically, we are attempting here to define the educational system under girding higher education. Our purpose here is to identify the various components of the system to illustrate how and where they interact, overlap, and come together so that we may better understand how WBI may impact higher education. To that end, we must first define an educational system in order to define our educational system, higher education.

Defining an Educational System

Banathy (1995) argues that modern society imposes on us complexities that cannot be dealt with by traditional reductionist methods of science. In this era of rapid information flow human systems interact with their environment in fluid and dynamic ways. There are too many interacting variables to allow easy problem solving; perhaps the best we can hope for is "problem management." But in order to achieve even this level of control we must first understand our systems and how they operate. This need becomes even greater in light of the additional complexity potential resident in the vast, chaotic amalgam that is the World Wide Web. Realizing that entire textbooks have been written on systems and systems theory (i.e. Banathy, 1968; von Bertalanffy, 1968), our goal here is to provide a few simple guidelines for consideration when implementing WBI.

Principle 1: A system is a set of organized components working toward a common goal.

Every educational system is working towards a common goal, whatever that goal may be (Banathy, 1991). For a corporate environment, that goal may be to increase revenue. If we consider a retail environment for a moment, the training of new sales people will put more people on the floor working with customers effectively, which may increase customer satisfaction, which can generate increased sales, which in turn drives profits and ultimately corporate revenue. But training can be costly for the company. The organization must pay not only the wages of trainers and students, but also the costs of developing the training and the associated costs of travel, lodging, per diem and lost productivity. An organization must decide, based on its goals, what training should look like, how much it can cost, and how ultimately it meets the goals of the system. Being able to align strategic goals and missions of the system to the training environment, assures replicability, and allows for precise troubleshooting when some component of the instruction fails (Dick & Carey, 1996).

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Principle 2: A change to one component of a system may cause a change in every other component of that system.

Understanding this idea is central to an effective use of Web-based Instruction. For most of us, WBI is a very different way of doing business than that to which we are accustomed. When we make the often radical change to WBI we run the risk of causing drastic changes in the rest of our organization. Offering a course on the Web requires us to reconsider aspects of the system that we often take for granted. How will the change affect textbooks? What will become of custodial services? What happens to corporate and university libraries when students are no longer on campus? Will scheduling change from the purview of facilities to the purview of information systems? These and numerous other issues will need to be considered. Remember the lesson of chaos theory, that a butterfly flapping its wings in Brazil can create a hurricane in Texas (Gleick, 1987), only changing to WBI is not so much like a butterfly flapping its wings as it is a jet plane revving its engines.

Principle 3: Every educational system is different.

While general systems theory holds that there are elements common to systems, every system is unique. Every system has particular features about it that provide its strengths and weaknesses. There do exist macro level pieces of a system that may be common to any educational system. Students, instructors, assessment, delivery, and management can be common to all environments. However, different environments will have different requirements. For example, the instructors in a corporate environment may have no other responsibilities beyond those associated with the classes they teach. In higher education, however, instructors often have not only teaching responsibilities, but research expectations and committee assignments as well. While both may be involved in instruction, the other components of the system will vary. Analysis of your own system and its particular requirements is important to before training begins.

It is important to note that we are working within the framework of Higher Education here. While we have written on WBI in other environments, (Jones, Harmon, & Lowther, 2002) we are writing here specifically to higher education. We chose higher education as an example for a number of reasons. One, it is an environment that we work in and understand. Two, it is an environment that is often imitated in other educational institutions. We feel that much of what we say could apply to any educational system, but because of space we'll limit our discussion to a university environment.

Defining the mission

To begin, we focus not on student learning, but on the mission of the institution, whatever it may be. All components of the system should work together to promote this mission. Student learning may represent only one part of it. We divide our model into four primary components, three of which are based on the common faculty perspective of the mission, namely **teaching**, **research** and **service**, supplemented by the fourth factor, **management**.

Teaching

The teaching component includes everything having to do with students, ranging from public relations, which might include such things as athletic teams, to on-campus housing, dining, and transportation systems. We believe that we can capture the complexity of this component with three primary elements. (See Table 1) Note that as with all other pieces of our system, activities within one component often overlap with other components.

Table 1. Elements of the teaching component

Element	Definitions
Student Recruitment	Deals with attracting students to the university. Impacts student services, quality of academic programs, types of athletic programs and other factors which may influence a student's decision to attend a university.
Student Retention	Keeping students enrolled in the university. Deals with issues such as campus life, academic assistance, and generally keeping the quality of the student experience high.
Student Matriculation	Ensuring that students progress and graduate in a timely fashion. Deals with access to classes and curriculums that are accessible and possible to finish in a

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	reasonable amount of time.

Research

At many universities the research component may be tacitly viewed as the most important component of the system. Even at primarily teaching institutions, tenure and promotion decisions may rest significantly upon research (Boyer, 1997). The degree to which research is seen as a driving force at a university will vary considerably depending upon the institution's mission and goals. However, research will retain a prominent role in the academic community, and the best researchers will accumulate the most prestige and resources. Table 2 defines major elements of the research component.

Table 2. Elements of the Research component

Element	Definitions
Research Funding	Identifying funding sources, writing and obtaining grants. Also includes administration of grants and any profits realized from research.
Research Investigation	Defining and conducting research. The establishment and execution of a productive research agenda.
Research Dissemination	Making public the results of research through journals, conferences, and increasingly, the WWW.

Service

Service is generally the least rewarded of university tasks but ironically often seems to require the most time. Typically speaking, service happens inside the university, through such outlets as faculty governance, and outside of the university as outreach to the local community or to your community of professionals. Table 3 illustrates the two typical types of university service.

Table 3. Elements of the Service component

Element	Definitions
Governance	Participating in the self-governing process by serving on such bodies as departmental committees or the University senate.
Outreach	Service to one's profession or community. This may include such things as holding offices in professional organizations, serving as editors for journals, or volunteering time for professionally related community service.

Management

The fourth major component of our system is often the least regarded by faculty and students because it appears to have little direct impact on the teaching and learning. However, management serves to insure that the proper resources are available and are applied to the efficient functioning of the other components. Management can be the glue that holds the rest of the system together. Major elements of the management component are listed in table 4.

Table 4. Elements of the management component.

Element	Definitions
Faculty & staff recruitment & retention	Locating and keeping qualified personnel. Includes developing and implementing attractive compensation packages. Impacts the institution's reputation.
Logistical operations	The day-to-day functioning of a university. Everything from ordering the right books in the bookstore to making sure the trash gets emptied.
Program Evaluation	Making sure that the system itself is both appropriate and working correctly.
Finance	Finance is an aspect of the management component includes such things as budget, publicity, and alumni relations. Budget is at its most basic, the acquisition and distribution of funds (i.e.

	working with legislatures and donors) and managing tuition, fees, and salaries. Since publicity is usually considered as goodwill and has financial value we include it here. Publicity would include everything from University logos to PR campaigns. Alumni relations involve maintaining contacts with past graduates of the university for purposes of maintaining the reputation of the institution and in attracting donations.

We propose these areas as an example of the major components of an educational system. Other aspects of the system, such as stakeholders and the interactions among the components are beyond the scope of this paper. While we realize that we have not captured every element of every component, we do feel that these are representative and give us a starting place for looking at how WBI might impact the educational system. However before we look at its impact on the system, we must first look at how the Web might be used within the system.

Five Levels of Web Use

When faced with the prospect or requirement or of using the Web in education, many people assume that they are being asked to create an online environment that will be a stand-alone, self-sustaining educational product. While this may be the goal of some environments, it need not be the goal of all. Harmon and Jones (1999) suggest five levels of use of the Web common in schools, colleges, and corporations. These levels represent a continuum from basic occasional use to advanced continual use. We feel that these levels go a long way towards helping stakeholders understand how the Web might be used in an education or training setting. Each level provides for particular uses and classifications of interaction between the students and teachers, and between the humans and the technology. Table Five defines and summarizes each of the levels.

Table 5. Levels of WWW use in education. From Harmon and Jones (1999).

Level Of Web Use	**Description**
Level 0: No Web Use	The default level. Implies no Web use at all.
Level 1: Informational	Providing relatively stable information to the student typically consisting of instructor placed items such as the syllabus, course schedules, and contact information. This sort of information is easily created by the instructor or an assistant, requires little or no daily maintenance, and takes up minimal space and bandwidth.
Level 2: Supplemental	Provides course content information for the learner. May consist of the instructor placed course notes and other handouts. A typical example would be a PowerPoint presentation saved as an HTML document and placed on the Web for students to review later.
Level 3: Essential	The student cannot be a productive member of the class without regular Web access to the course. At this level the student obtains most, if not all of the written course content information from the Web.
Level 4: Communal	Classes meet both face-to-face and on-line. Course content may be provided in an on-line environment or in a traditional classroom environment. Ideally, students generate much of the course content themselves.
Level 5: Immersive	All of the course content and course interactions occur on-line. Does not refer to the more traditional idea of distance learning. Instead, this level should be seen as a sophisticated, constructivist virtual learning community.

It is our position that these levels can help any organization define how it plans to use the Web in education. Knowing at which level you are working will help you understand how your work can affect the entire educational system. To illustrate this, we propose a model for considering systemic issues in higher education as they relate to WBI.

The Model

To illustrate our proposed method for accounting for all systemic issues within higher education as it relates to WBI, we offer the model shown in Figure 1. The model can be read by taking each component of a higher education system, teaching (T), research (R), service (S), and management (M) and filtering it through the five levels of WBI, represented numerically. It is possible to take a single component of the system and run it through all levels or a single level. Likewise, the entire system can be run through a single level or through all levels collectively.

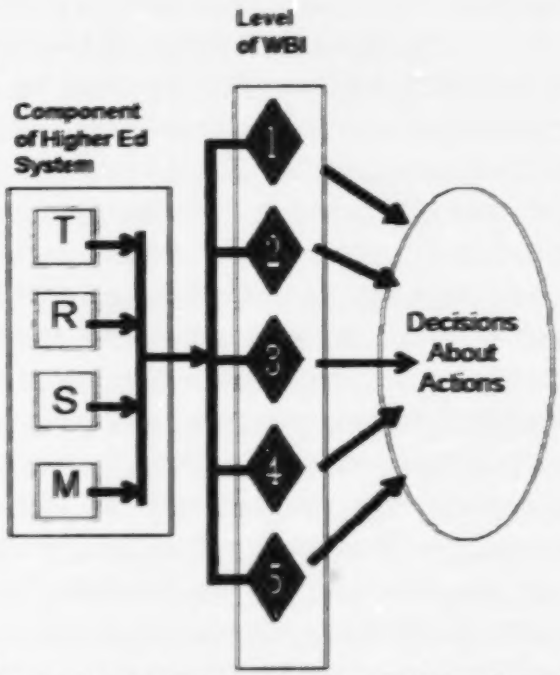

Figure 1. A model used to address Higher Education System Components as they relate to WBI.

To further explain how the model might be used, we will take each component of a higher education system and discuss it as it relates to each of the five levels of WBI, excluding Level 0. It should be noted that we would recommend a careful analysis of your individual environment. What we provide in the following pages is a generic discussion of issues in a higher education system as they relate specifically to WBI.

Level 1: Informational Web Use

The easiest level to reach, informational use of the Web may make the greatest impact on the Management component. Teaching itself may not be impacted greatly, but student's decisions on courses may. This level involves merely providing basic information to stakeholders via the Web

Teaching

Students today are thought of as consumers. Before they spend money on a class, or make a decision on a degree program, they may do considerable research. While putting a syllabus online may not impact instruction much, it will impact access to course information. This may provide better visibility to low enrollment classes or provide general publicity for a particular degree program. It may also impact faculty time and teaching expenses. Because the course syllabus is online, faculty do not have to spend as much time answering questions about classes to prospective students, or students may have more focused questions for the faculty member.

Research

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At this level, research may not be impacted greatly for the faculty member, but institutional research could have a field day. Data could be tracked on the relationship of access to syllabi to course enrollment and course evaluations. This is the kind of data that can help justify technical and support positions as well as capital upgrades to aging computing infrastructure. In addition, the university may wish to provide an online listing of faculty research interests, perhaps thereby generating some research opportunities, fostering collaborations, or providing assistance in research funding.

Service

While level 1 may impact committee work slightly (i.e. in terms of organizational charts and committee memberships placed online), the greatest impact on service at this level may come to faculty who specialize in technology. Technology faculty, (i.e. faculty in Instructional Technology, Information Science, or Computer Science), are often asked to take on the responsibility of creating and maintaining programmatic Web pages. The danger in this is that technology faculty are typically in academic units and not service units. Technology faculty can no more be expected to do other peoples Web pages for them than the accounting faculty could be expected to do everybody's taxes. Having the expertise does not mean that you have the time or inclination. If all faculty units would be required to do this as part of their service requirements, then their contracts should be evaluated to make sure that proper consideration is made for this work during tenure, promotion, and merit decisions.

Management

Making full use of the WWW in higher education will improve the university's goodwill or public image. At the time of this writing, any institution that makes it an institutional priority to have every course syllabus online could be seen as a leader in technology. As it becomes more convenient for current and prospective students to locate course information and make better-informed decisions about classes and degree programs the reputation of the university grows. With it grows enrollment, tuition dollars, and funding. But this level may be more difficult to achieve than some think. For example, at one large urban institution that we know of, there are 1,155 undergraduate classes and 1,105 graduate classes listed in the respective catalogs. To put all course syllabi on line, somebody must make sure that all of these syllabi are found, approved, and posted, not to mention updated as needed. This is a daunting task regardless of whether the responsibility is localized within a department or centralized by an outside office. Even though Level 1 is the easiest to achieve from a technical standpoint, it would still require much effort from a planning standpoint.

At Level 1, institutions must make critical and defining decisions about intellectual property and faculty load. Professors often teach classes focusing on their research, so a particular course may rely heavily on a particular person being there to teach it. As more information becomes public an important question must be answered: Who owns the course? Does the university own it because the university employed Professor Smith, or does Professor Smith own it as intellectual property? Putting materials online is not something most people have scheduled time for in their careers. If a faculty member makes the time, should they be compensated for doing this? If it is required of faculty to put course materials on line, should they be given reduced teaching loads? Should they be paid more money? Should a faculty member be paid royalties if the university continues to use the material after the professor leaves? These are critical questions that will need to be addressed.

Level 2: Supplemental Web Use

Supplemental Web use appears to make its greatest impact on actual classroom issues today. These classroom issues in turn impact the educational system in a variety of ways.

Teaching

The most common use of supplemental Web use is putting course notes and handouts on line. At this level the course schedule, which we distinguish here from the syllabus, will go online as well. One advantage of putting the schedule on line is that courses may change with the needs of the students. Course scheduling changes can be made and posted on a weekly basis. This will require more planning on the part of the instructor, and regular access by the students.

Many faculty are taking course handouts, such as Power Point slides, and placing them online as course notes or handouts to be reviewed later. However, a surprise to some people is that once students get the handouts

they stop having a reason to come to class. Rightly or wrongly, lecture notes are often seen as the sole course content. Historically students go to class to get information they will need to pass tests on didactic content. If that didactic content is going to be placed on line, then they may indeed have few reasons to go to class unless the nature of the class changes. So at its most basic point, Supplemental Web use, perhaps more than any, will make the greatest impact on what will happen inside the physical classroom.

As a professor, if I no longer give lectures on a daily basis, what do I do? If the students no longer take notes, what do they do? Obviously this does not sound the death knell for classroom instruction or even the lecture. What it might do is breath new life into the classroom. Good teaching is not merely good public speaking. Good teaching is about providing opportunities for students to become engaged in the learning process (Jonnassen, 1996).

Research

The biggest impact on research at the supplemental level is in dissemination. Researchers can post their preliminary results online and get immediate feedback from their peers. They can access their peers' findings that may affect their own work without having to wait months or even years before seeing them in a journal. Indeed, it is for these sorts of activities that the Web as initially created. (Crossman, 1997) Of course this easy access also removes the safety net of the referring process creating its own set of problems.

In addition, any change in the amount of time faculty spend teaching will have a direct impact on the amount of research and publishing they can do. While certain faculty may be able to use their classes as research settings, clearly all will not. Faculty who make the effort to work on their teaching are rarely rewarded for it (Boyer, 1997). But teaching is a significant type of scholarship, and one that should be treated as such (Boyer, 1997). University tenure committees must begin to recognize this and reward it not only as good teaching, but as good scholarship as well.

Service

If what we know as "traditional" classes change, then we can expect growing pains as this change takes place. If class formats begin to change, then institutions can expect successes at some points, and dismal failures at others. As faculty learn to teach differently, students will need to learn to learn differently. Changes in structure will nearly always be met with resistance initially (Rogers, 1983). At the service component, expect greater time spent in grade appeals. As faculty spend more time working on teaching, expect appeals on tenure decisions. The self-governance function itself may become more open to scrutiny as meeting agendas and minutes are published online All of this will impact the amount of university service done through self-governance.

Management

In the management component, this level will ultimately be championed if for no other reason than to save printing and copying costs. Freeing up money from departmental photocopying alone may be a tremendous financial boon. However, the administration will need to be tolerant of experimentation. Teaching evaluations may be poor for a period of time as faculty learn to teach differently, and students strive to understand a shift in the focus of the classroom experience. However, the change may bring the university greater recognition and ultimately better faculty, more students, and increased funding.

Level 3: Essential Web Use

As far as teaching and learning goes, putting course information on the Web at level 3 makes two significant assumptions: (1) Faculty and students have appropriate computing and internet access (2) Faculty and students have the requisite skills or support to use the Web. At many universities, these two assumptions are far from being realities.

Teaching

Obviously if the student needs Web access to be a contributing member of the class then the student will need Web skills. The question then becomes where and when does the student get these skills? There have been arguments made that newer students may bring these skills to campus with them. If not, then the university may need to rethink the core curriculum for new students. Freshmen are taught how to write and how to read critically, through "101" courses. Perhaps information technology literacy should also become a "101" course for students

who do not possess these skills. At Level 3, we will very definitely encounter the issues of technology haves and have nots (Trotter, 1996). But students are not the only ones who suffer from poorly developed computer skills. Many faculty do not have adequate equipment in their offices, let alone the skills to produce essential materials.

Research

As with Level 2, teaching should be seen here as a type of scholarship, one that can be measured against particular criteria to ensure that the same rigor that is applied to the teaching process that is applied to the referee process (Boyer, 1997). Faculty may begin to publish research results solely in on-line refereed journals. Promotion and tenure committees may need to be educated as to the value of these sorts of research outlets, and to help them tell the difference between an on-line journal, and simply a paper that has been posted on-line. While I might be able to publish on-line at will, a posted paper is quite different than a published paper.

Service

This level also impacts the service components as well. For with new teaching strategies there will also be new policies and committees. The administration will need to form new committees and new mechanisms for dealing with information from these committees. Existing committees may find more work for themselves as well. Grade appeals are likely to be common for a period of time as faculty and students work towards understanding new strategies. Additionally, the faculty reward structure may need to be revisited. The business of putting education on line is more than simply converting syllabi and handouts to HTML formats. It will involve a comprehensive look at the way that students study and teachers teach. There will be new excuses to deal with (the server ate my homework?) and new ways of meeting with students (such as online office hours). The copy and paste commands, along with copious online term paper sites (i.e., http://homeworksucks.com) have made plagiarism much easier. Faculty will need support and release time to do the job well. Students will need time and comprehensive information regarding what the changed expectations are. Finding both support and time may be difficult at many institutions.

In addition, in the professional service element, faculty may spend more time working for their professional organization virtually. Indeed, annual conferences may begin to occur solely online, freeing up time and travel money. However as time increases so does the amount of work required. Faculty my find themselves stretched thinner and thinner as more organizations seek their aid in online endeavors.

Management

Providing for these assumptions will require significant attention from the Management component of the system. At the Management component, this will make its most significant impact in the element of faculty and staff recruitment and Finance. In order to use the Web at level 3, the institution must make a commitment to a faculty and staff that can manage the technology. It is common knowledge that at many institutions there are faculty who are not going to make any changes in the way that they teach. Some institutions are relying on attrition and aggressive faculty training and support to move their institution into a technology using institution. Moreover, the increased burden on the network infrastructure that essential Web use entails may overwhelm some systems. Management will have to work and plan carefully to ensure that university computing resources can meet the demand.

Level 4: Communal Web Use

At the most basic level, Level 4 will need to change the expectations of students and faculty. If classes meet both face to face and on line, then this may impact logistical operations under the management component.

Teaching

Learning to teach online is quite an experience. At this level faculty need not only help in putting information on line, but help in managing the environment as well. Students begin to generate some of the course content themselves requiring faculty to evaluate new content and students to take responsibility for their own learning. This level may require the most fundamental shift in faculties and students mind-sets.

Research

Faculty may begin richer and more frequent collaborations with other researchers at this level of Web use. Distance becomes important only as a function of time of day. Researchers can begin to undertake projects of a scope undreamed of before. Consider for example efforts to crack cryptographic codes that use idle computing time on millions of desktop computers worldwide. Thanks to the Web (and internet) researchers can now do for an insignificant fraction of the cost and time what before would have taken supercomputers working thousands of hours and costing millions of dollars. Massive and convenient collaboration opens the door to more productive research in all fields.

Combining research and teaching becomes possible for a number of faculty. Education faculty may certainly conduct research on the benefits and limits of WBI (Reeves & Reeves, 1997), but other faculty, particularly those in the social sciences, may find research opportunities as well. Special educators may look at the benefits of WBI for students with special needs (Holzberg, 1996). Sociologists may look at the development of online relationships. Information scientists may develop and test new theories and devices, and other scholars can find outlets here as well. The biggest concern here is not that you can do research with your teaching, but rather that within the existing system you get credit for doing the things that advance the mission of the institution. Again we point to Boyer (1997) as having much to say on this subject.

Service

Meetings may now begin to take place entirely online. If nothing else, the onerous task of scheduling meetings will be eased at this level through the use of asynchronous work. Further, records of meetings will be highly detailed and accurate.

Management

The management component of the system can benefit from the use of the WWW at this level. Classes typically scheduled weekly in a room may not need the room every week. Depending on how classes are scheduled, it may be possible to teach two or more classes in the same room on the same night at the same time. This could be a tremendous boon for high use classrooms such as computer labs. Other benefits are just as real if less obvious. Georgia State University is actively encouraging faculty to hold classes online as part of an effort to reduce pollution from traffic in the City of Atlanta.

Communal Web use may also change the way students view schedules and classes. Many students don't feel comfortable with distance education, but they still live too far from campus to drive to every class meeting. Online classes may mean less driving time for students, which in turn means greater convenience for non-traditional students, which in turn provides the university with a reputation of supporting non-traditional students. These can be good things. As fathers of young children, the authors have appreciated the flexibility of conducting classes online from home. It means that at the very least we can be there to say goodnight after a long graduate class. Students also appreciate this flexibility. However most universities have contact hour requirements that state (roughly) that the student and teacher must be in the same room for a set number of hours over the period of the semester. Strict interpretations of existing contact hour requirements will make level 4 use impossible and mean that faculty and students cannot take advantage of this level of Web use.

In addition, as classes begin to move entirely online, the whole issue of what comprises a university begins to change. No longer is a university a place. Far from the Ivory Towers in isolated campuses of yore, universities will be thrust in among all of the other unwashed data on the net. Traditional rivalries and competitors may be replaced with competitors from across the country or around the world. Management will have to carefully consider market segments and demographics in much the same way broadcasting networks do now.

Level 5: Immersive Web Use

This level is steeped in the constructivist paradigm. In it, faculty, staff and students work to assist each other as they approach their respective tasks individually. Socially constructed knowledge exists here, but is secondary to individual constructions.

Teaching

At level five students and teachers interact with each other and directly with the knowledge base. The classroom becomes a true learning community in which knowledge is acquired, created and distributed on an egalitarian basis. The faculty member becomes more of a mentor than an instructor and students and faculty contribute to the literature in a field as well as learn from it. Naturally, this level is best suited to more advanced students and courses.

Though it may seem counter intuitive, the more students a course has, the lower the level of WBI that is appropriate. A fully immersive WBI environment as described in level 5 requires significantly more preparation time and classroom management time for the instructor than a traditional course. In our experience, a large part of this time comes from interacting with individual students. We believe that a single instructor cannot manage more than 10 to 20 students in this type of environment. For every additional 10 to 20 students the instructor should have some sort of teaching assistance. On the other hand, for courses with hundreds of students it makes more sense to distribute as much information as possible on-line. Therefore, for large numbers of students levels 1,2, and 3 are indicated. But levels four and five, in which more interaction is required, should be reserved for smaller classes. This is often times a struggle as you begin to think about implementing Web-based instruction.

Research

Research becomes more integrated with teaching as students as well as faculty begin publishing scholarly work online. Teaching at this level may well follow the conservatory method or that of a hard science research group, whose learning comes in the context of carrying out a research agenda.

Service

Service at this level is conducted entirely online. Virtual meetings and telecommuting are the rule rather than the exception. Virtual "town meetings" may take the place of some committee work where the entire university community participates in discussion of and action on an issue. There is a danger here of grid locked chaos, but the example of the governance of the internet itself suggests that immersive service can work quite well.

Management

The educational system may change strikingly at Level 5. There are organizations, and entire institutions emerging that do nothing but Immersive Web use (The Western Governors University, Nova, The University of Phoenix). In this case, the system itself will evolve around the particular needs and particulars of the university. However, if a traditional university begins to do this type of instruction, then many elements will be impacted. Course evaluations will need to be reconsidered to deal with a student body at a distance. Office hour requirements may need to be rethought to capture the nature of a new kind of student interaction.

This decision will impact the management of the institution significantly. Administrators who are pressed for classroom space and the need to generate more tuition related dollars often encourage faculty to take more students in on-line environments. Administrators need to understand the nature of the environment so that they might help make better policy.

Conclusion

Too often in the history of educational technologies has innovation been carried on in a piecemeal and haphazard fashion. Many creative ideas have been postponed or abandoned altogether, not because they were bad or unworkable, but because they were implemented in ways that at best made success questionable, and at worst guaranteed failure. Web-based education will not go away. It has gained too much momentum; it has reached Rogers' (1983) critical mass. It may founder in higher education for quite some time before it is embraced fully and used effectively as a teaching and learning tool. Or it may, on the other hand, revolutionize the business of higher education. It may enable faculty and students to embrace new methodologies of learning and instruction and ma ke possible rapid, efficient, and effective learning environments of a sort never seen before.

It will probably do both. Some institutions will be incredibly successful at adopting Web-based instruction. Some institutions will be dismal failures. We believe the difference between them will be the manner in which they go about that adoption. Those organizations that undertake the adoption of Web-based instruction in a systematic and systemic fashion stand a good chance of becoming the premier institutions of the next few decades. They will consider the impact of Web-based instruction in all areas. They will acknowledge that Web-based instruction means

different things to different people, that there are levels of WBI. They will probably not move as a whole from one level in our continuum to the next. Instead, different parts of an institution will be at different levels of the continuum at different times. It is likely that some parts of an institution will move down levels rather than up levels. This could occur as they experience disenchantment with the Web or technical frustration. Successful institutions will on average, we believe, continue to move up the continuum toward immersive Web use. Higher education in this country will eventually take place predominantly on the Web. It may take some time, but we academics are not easily discouraged. Instructors who wish to teach otherwise may one day have to do it in secret.

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